This listing of claims will replace all prior version, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A method for detecting a kick in a borehole, comprising:
   acquiring a set of measurements with a sonic tool in the borehole;
   determining borehole mud slowness from the set of measurements; and
   comparing the mud slowness with a selected criterion to detect a kick in a borehole,
   wherein the determining the mud slowness comprises determining fluid mode slowness as a function of frequency for at least one fluid mode, and determining the mud slowness from the fluid mode slowness.

2. (original) The method of claim 1, wherein the determining fluid mode slowness as a function of frequency comprises:
   estimating normalized wave numbers for the at least one fluid mode;
   unwrapping the normalized wave numbers to compute the fluid mode slowness for the at least one fluid mode at all frequencies; and
   generating a histogram of the fluid mode slowness versus frequency for the at least one fluid mode.

3. (original) The method of claim 2, wherein the determining the mud slowness is by identifying a maximum fluid mode slowness from the histogram.

4. (original) The method of claim 2, further comprising removing zero value wave numbers from the normalized wave numbers.

5. (original) The method of claim 1, wherein the determining the mud slowness comprises determining a maximum slowness from an asymptotic approach of the fluid mode slowness as a function of frequency in a high frequency region.

6. (original) The method of claim 1, further comprising sending a warning signal uphole if the mud slowness exceeds the selected criterion.

7. (original) The method of claim 1, wherein the set of measurements comprise signals in a frequency range of 5 KHz to 500 KHz.

8. (original) The method of claim 1, wherein the set of measurements comprise signals in a frequency range of 10 KHz to 100 KHz.

9. (original) A system for detecting a kick in a borehole, comprising:

a sonic sensor configured to acquire a set of sonic measurements in the borehole; and

circuitry configured to determine borehole mud slowness from the set of sonic measurements and to compare the determined mud slowness with a selected criterion, wherein the mud slowness is determined from a fluid mode slowness derived from the set of sonic measurements.

10. (original) The system of claim 9, wherein the mud slowness is determined from an asymptotic approach of the fluid mode slowness towards a limiting value.

11. (original) The system of claim 9, wherein the fluid mode slowness is determined by:

estimating normalized wave numbers for a fluid mode;

unwrapping the normalized wave numbers to compute the fluid mode slowness for the fluid mode at all frequencies; and

generating a histogram of the fluid mode slowness versus frequency for the fluid mode.

12. (original) The system of claim 11, wherein the mud slowness is determined by identifying a maximum fluid mode slowness from the histogram.

13. (original) The system of claim 11, further comprising removing zero value wave numbers from the normalized wave numbers.

14. (original) The system of claim 9, wherein the sonic sensor is configured to acquire signals in a frequency range of 5 KHz to 500 KHz.

15. (original) The system of claim 9, wherein the sonic sensor is configured to acquire signals in a frequency range of 10 KHz to 100 KHz.

16. (original) The system of claim 9, further comprising a telemetry link configured to send a warning signal uphole when the mud slowness exceeds the selected criterion.

17. (original) A system for detecting a kick in a borehole, comprising:

a sonic sensor configured to acquire a set of sonic measurements in the borehole;

processor means adapted to determine borehole mud slowness from the set of sonic measurements and to compare the determined mud slowness with a selected criterion, wherein the mud slowness is determined from a fluid mode slowness derived from the set of sonic measurements; and

the processor means configured to trigger a warning signal when the mud slowness exceeds the selected criterion.

18. (original) The system of claim 17, wherein the mud slowness is determined from an asymptotic approach of the fluid mode slowness towards a limiting value.

19. (original) The system of claim 17, wherein the fluid mode slowness is determined by:

estimating normalized wave numbers for a fluid mode;

unwrapping the normalized wave numbers to compute the fluid mode slowness for the fluid mode at all frequencies; and

generating a histogram of the fluid mode slowness versus frequency for the fluid mode.

20. (original) The system of claim 19, wherein the mud slowness is determined by identifying a maximum fluid mode slowness from the histogram.